

CLAIMS

What is claimed is:

- 1 1. A stent comprising:
2 a stent member; and
3 an insoluble fibrous component, wherein the component is sufficiently
4 loosely wrapped around the stent to allow the component to deform in a manner that
5 forms a reinforcing thrombus plug.
- 1 2. The stent of claim 1, wherein the insoluble fibrous component comprises at least one
2 nanofiber.
- 1 3. The stent of claim 1, wherein the insoluble fibrous component comprises a
2 compound selected from the group consisting of poly(caprolactone), polyethylene
3 terephthalate, fibrinogen, polyolefins, polyethylene, polypropylene, linear
4 poly(ethylenimine), cellulose acetate, grafted cellulose, poly (L-lactic acid), poly
5 (ethyleneoxide), poly (hydroxyethylmethacrylate), poly (glycolic acid) poly
6 vinylpyrrolidone, polyethylene glycol, polyethylene oxazoline, polyester, polyacrylic
7 acid, polyacrylic acid esters, polyphosphazines, polycyanoacrylate, polyvinyl
8 amines, polyethylene imines, polyethylene amines, polyacrylamides, cellulose,
9 polyorthoesters, polyanhydrides, polyketals, polyacetals, polyureas, and
10 polycarbonate.
- 1 4. The stent of claim 1, wherein the insoluble fibrous component comprises a
2 thrombogenic material that initiates the formation of a thrombus.
- 1 5. The stent of claim 4, wherein the thrombogenic material at least partially blocks the
2 entrance to a structure selected from the group consisting of an aneurysm, a fistula,
3 and an opening in a blood vessel wall.
- 1 6. A method for manufacturing a stent comprising the steps of:
2 coating a stent with a release layer; and

3 coating the release layer with an insoluble fibrous layer, wherein the release
4 layer is capable of being degraded leaving the insoluble fibrous layer sufficiently
5 loosely wrapped around the stent to allow the insoluble fibrous layer to deform and
6 move in a manner that allows it to form a reinforcing plug.

1 7. The method of claim 6, wherein the release layer is soluble in blood the fibrous
2 layer is insoluble in blood.

1 8. The method of claim 6, wherein the release layer is capable of being digested by
2 enzymes.

1 9. The method of claim 6, wherein the release layer comprises a material selected from
2 the group consisting of polysaccharides, corn syrup, gelatin, collagen, peptides,
3 proteins, nucleic acids, and ribonucleic acids.

1 10. The method of claim 6, wherein the insoluble fibrous layer comprises a
2 thrombogenic material.

1 11. The method of claim 10, wherein the thrombogenic material is selected from the
2 group consisting of poly(caprolactone), polyethylene terephthalate, fibrinogen,
3 polyolefins, polyethylene, polypropylene, linear poly(ethylenimine), cellulose
4 acetate, grafted cellulose, poly (L-lactic acid), poly (ethyleneoxide), poly
5 (hydroxyethylmethacrylate), poly (glycolic acid) poly vinylpyrrolidone,
6 polyethylene glycol, polyethylene oxazoline, polyester, polyacrylic acid, polyacrylic
7 acid esters, polyphosphazines, polycyanoacrylate, polyvinyl amines, polyethylene
8 imines, polyethylene amines, polyacrylamides, cellulose, polyorthoesters,
9 polyanhydrides, polyketals, polyacetals, polyureas, and polycarbonate.

1 12. The method of claim 6, wherein the release layer comprises a nanofiber.

1 13. The method of claim 6, wherein the insoluble fibrous layer comprises a nanofiber.

- 1 14. The method of claim 6, wherein the steps of coating the stent comprises
2 electrospinning.
- 1 15. The method of claim 6, wherein the step of coating the release layer with an
2 insoluble fibrous layer comprises electrospinning.
- 1 16. A method for using the stent of claim 1 comprising the step of implanting the stent in
2 a living organism.
- 1 17. A balloon catheter comprising:
2 an insoluble fibrous layer, wherein the layer is capable of becoming loosely
3 wrapped around the balloon catheter upon degradation of a release component.
- 1 18 The balloon catheter of claim 17, wherein the insoluble fibrous layer comprises a
2 nanofiber.
- 1 19. The balloon catheter of claim 17, wherein the external fibrous layer comprises
2 polyethyleneoxide, polyethylene glycol, polyethylene oxazoline, polyester,
3 polycaprolactone, polyacrylic acid, polyacrylic acid esters,
4 polyhydroxyethylmethacrylate, polyvinyl pyrrolidone, polyphosphazines,
5 polycyanoacrylate, polyvinyl amines, polyethylene imines, polyethylene amines,
6 polyacrylamides, cellulose, cellulose derivatives, proteins, polyorthoesters,
7 polyanhydrides, polyketals, polyacetals, polyureas, and polycarbonate, or a
8 combination thereof.
- 1 20. The balloon catheter of claim 17, wherein the external layer comprises a
2 thrombogenic material that initiates the formation of a thrombus.
- 1 21. The balloon catheter of claim 20, wherein the thrombogenic material at least
2 partially blocks the entrance to an aneurysm or an opening in a blood vessel wall.

- 1 22. A method for manufacturing a balloon catheter having an external fibrous layer that
2 is loosely wrapped around the balloon catheter comprising the steps:
3 coating a balloon catheter's external surface with a release layer;
4 coating the outer surface of the release layer with a fibrous layer; and
5 removing the release layer thereby leaving the fibrous layer loosely
6 wrapped around the balloon catheter.
- 1 23. The method of claim 22, wherein the release layer is soluble and the fibrous layer is
2 insoluble in a liquid.
- 1 24. The method of claim 22, wherein the release layer can be degraded to a soluble or
2 gaseous species by enzymes, small molecules, or other reactive substances.
- 1 25. The method of claim 22, wherein the release layer comprises polyethyleneoxide,
2 polyethylene glycol, polyethylene oxazoline, polyester, polycaprolactone,
3 polyacrylic acid, polyacrylic acid esters, polyhydroxyethylmethacrylate, polyvinyl
4 pyrrolidone, polyphosphazines, polycyanoacrylate, polyvinyl amines, polyethylene
5 imines, polyethylene amines, polyacrylamides, cellulose, cellulose derivatives,
6 proteins, polyorthoesters, polyanhydrides, polyketals, polyacetals, polyureas, and
7 polycarbonate, or a combination thereof.
- 1 26. The method of claim 22, wherein the fibrous layer comprises a thrombogenic agent.
- 1 27. The method of claim 26, wherein the thrombogenic agent is fibrinogen, collagen, or
2 a combination thereof.
- 1 28. The method of claim 22, wherein the release layer comprises a nanofiber.
- 1 29. The method of claim 22, wherein the fibrous layer comprises a nanofiber.
- 1 30. The method of claim 22, wherein the step of coating the balloon catheter's external
2 surface comprises electrospinning.

- 1 31. The method of claim 22, wherein the step of coating the outer surface of the release
2 layer with a fibrous layer comprises electrospinning.
- 1 32. A method for using a balloon catheter having an external fibrous layer that is loosely
2 wrapped around the balloon catheter comprising the step of implanting the balloon
3 catheter in a living organism.
- 1 33. A method for manufacturing a stent comprising the steps of:
2 Simultaneously coating a stent's external surface with a release component
3 and an insoluble fibrous component, wherein the release component is capable of
4 being degraded leaving the insoluble fibrous component sufficiently loosely wrapped
5 around the stent to allow the insoluble fibrous layer to deform and move in a manner
6 that forms a reinforced thrombus plug.
- 1 34. The method of claim 33, wherein the release component is soluble and the insoluble
2 fibrous layer is insoluble in blood.
- 1 35. The method of claim 33, wherein the insoluble release layer can be degraded by
2 enzymes.
- 1 36. The method of claim 33, wherein the release layer comprises a compound selected
2 from the group consisting of polysaccharides, corn syrup, gelatin, collagen, peptides,
3 ribonucleic acids, deoxyribonucleic acids, glycogen, and glycoproteins.
- 1 37. The method of claim 33, wherein the insoluble fibrous component comprises a
2 thrombogenic material.
- 1 38. The method of claim 37, wherein the thrombogenic material is fibrinogen, collagen,
2 or a combination thereof.

- 1 39. The method of claim 33, wherein the insoluble release component comprises a
2 nanofiber.
- 1 40. The method of claim 33, wherein the insoluble fibrous component comprises a
2 nanofiber.
- 1 41. The method of claim 33, wherein the step of coating the stent comprises a method
2 selected from the group consisting of electrospinning and nanofibers by gas jet.
- 1 42. The method of claim 33, wherein the step of coating the release component with an
2 insoluble fibrous component comprises a method selected from the group consisting
3 of electrospinning and nanofibers by gas jet.